• COLORADO RIVER •

AQUEDUCT NEWS

THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

Vol. 1 OCTOBER 20, 1934 No. 19

OVER SHE GOES!

Another carload of muck from the East Coachella tunnel reaches its final resting place at Berdoo.

· COLORADO RIVER ·
AQUEDUCT NEWS
THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA
LOS ANGELES, CALIFORNIA

Published twice monthly in the interest of Field and Office Workers on the Colorado River Aqueduct, and for the information of all other citizens of the Metropolitan Water District.

Vol. 1 October 20, 1934 No. 19

HALFWAY

A glance at the tunnel progress table on Page 6 of this issue of the NEWS will reveal the imminence of an important milestone in aqueduct construction—the halfway mark in tunnel excavation.

By the time this issue reaches its readers, aqueduct crews will have driven forty-five and one-half miles of 16-foot diameter bore, or exactly one-half of the greatest tunnel construction job ever undertaken at one time in the history of engineering.

The months during which this work has been going forward have seen flashes of spectacular speed on various sections of the job—this crew and that have smashed too many records for them to be enumerated here. But in the main, the first half of the aqueduct's tunnel driving has been notable for the consistent, day-in-and-day-out progress which has consumed the miles so steadily. It has been this type of work which has proved that there has been no "flash in the pan" element to the tunnel driving on the Colorado River Aqueduct.

And so, the NEWS pauses at this propitious time to salute the men "down under"—the hard-rockers who have reached the halfway point on a long and difficult journey.

SAFETY

Attention of all aqueduct workers is called to the statement of General Manager Weymouth printed on page 3, and the article by T. W. Osgood appearing with it.

No ponderous editorializing is necessary—the two pieces speak for themselves, indicating that every effort has been made, is being made, and will be made in the future to insure safety on the aqueduct.

In line with that policy, the NEWS is pleased to announce its contribution to safety cooperation. In future issues space will be reserved for the recording of the activities of the safety clubs along the aqueduct line. It is hoped that a medium may be established for the exchange of helpful, constructive ideas.

GENERAL MANAGER REVIEWS ACTIVITIES OF MONTH ON AQUEDUCT

(EDITOR'S NOTE: The following is a brief summary of the monthly report of General Manager and Chief Engineer Weymouth, filed with the Board of Directors in October, covering work during September. These summaries are presented each month.)

Legal Division

Proceedings for the delivery and payment of Interim Certificate No. 15 ($2,016,000) were completed, delivery being made on September 14. Proceedings in connection with the issuance and sale of $1,500,000 to the Public Works Administration were completed.

Miscellaneous Activities Division

Anticipating the launching of additional aqueduct construction work in the near future, the District's labor employment office during the month of September interviewed a number of applicants having the required experience. Certificates of Registration were issued to 594 employment applicants during September, the total number of such certificates issued up to October 1 being 5,619.

Field Engineering and Construction

Engineering—Surveys were made by Division 1 to establish the boundaries of gravel deposits along the Colorado River near Bowman Wash. The boundaries of the construction divisions of the aqueduct were changed to become effective October 1, 1934.

Safety Engineering — During the month 37 safety inspections were made of tunnels and surface workings.

Testing Laboratory—Tests were completed on 15,000 barrels of Riverside cement in storage at the plant which showed that this cement satisfactorily met the specifications. The studies to establish a uniform strength acceptance of cement were continued.

Operation of Utilities — During the month of September a total of 5,068,800 kwhr of power was used. About 12,000 telephone calls were handled, and 2,273,250 cu. ft. of water was delivered.

Parker Dam—Bureau of Reclamation —The engineers of the Bureau of Reclamation have been establishing the triangulation control for the dam construction and have made surveys for the diversion tunnel locations and camp site.

Aqueduct Construction—(See tunnel progress table on page 6) Excavation of Whitewater Tunnel No. 2 was completed on September 12. Excavation of Adit No. 4 of the Valverde tunnel was completed on August 31.

Civil Engineering

Specifications—Specifications were issued on Division 2 headquarters and construction of 30.5 miles of conduit and siphon.

Design—Plans were prepared for an experimental test layout for a siphon transition model.

Distribution—A report was completed on alternative plans for the distribution system based on coordination of Colorado River deliveries with deliveries from other sources and various rates of growth of the District.

Hydrography—Regular operation of Colorado River gages and sampling of camp water supplies were continued.

Electrical Engineering Division

The testing of model pumps was begun at the Caltech laboratory. Ninety-five per cent of the transmission line tower designs have been completed and are being checked. Arrangements were made to deliver power to Six Companies Inc. at Parker Dam. Specifications were prepared and issued for transformers which may be required to serve the canal and conduit work. Work was continued on the design of telephone installations for the permanent pumping plants and of the line from Iron Mountain to Boulder Dam.

Right-of-Way Division

Regular work was continued on the securing of aqueduct rights-of-way.

Personnel Division

August turnover for classified positions was the lowest to date, being less than one-half of one per cent; in unclassified positions, however, turnover increased from 6.27 per cent to 11.45 per cent.

Purchasing Division

A total of 810 purchase orders were issued covering purchases amounting to approximately $86,606.

Accounting and Costkeeping Division

Actual costs to September 30 amounted to $26,673,978.67, covering portions of works and activities, the total cost of which is estimated at $69,480,405.

ORGANIZATION OF SAFETY ENGINEERING FOR CONSTRUCTION WORK ON AQUEDUCT PROJECT IS DISCUSSED

By T. W. OSGOOD
Safety Engineer

The organization established by The Metropolitan Water District of Southern California to put into operation its safety policy embraces the following features:

THE SAFETY ENGINEER acts largely in a consulting capacity, studying the safety problem of the work, advising the superintendents, foremen and other supervisors of their problems and hazards and keeping the supervisors equipped with proper information and helping them in the conduct of their safety work; keeping them informed on the accident trend, on the causes and consequences of accidents, and of ways and means for preventing accidents.

This activity involves, in the main, inspection of physical conditions and of the practices of workmen and supervisors on the work; tests and approvals of safety devices; research; investigation of accidents; developing the safety spirit within the organization as a whole; the organization and functioning of safety committees and safety clubs; providing safety literature and bulletins; safety talks; safety competitions among construction units; promulgating safety rules; instruction in first-aid to the injured and in mine-rescue; organization and procedure at tunnel fires and other major emergencies; and compilation of records.

THE DIVISION ENGINEERS are vested with authority by provisions of the Specifications to enforce safety measures on the work. Quoting from letter dated March 2, 1933, issued by the General Manager and Chief Engineer, subject: Organization of Field Engineering—"It shall be the duty of the Division Engineer to see that health and safety rules are being observed; and that all other necessary or proper regulations are being followed." They also are actively promoting the safety issue by organizing safety committees and other activities.

CONTRACTOR. Quoting from the Specifications—"The contractor alone shall be responsible for the safety, efficiency and adequacy of his plant, appliances and methods—." "The contractor shall not again engage except with the written consent of the Engineer any employee who violates the safety, sanitary, or medical requirements."

Cooperation In Safety Urged By General Manager

By F. E. WEYMOUTH
Gen. Mgr. and Chief Engineer, Metropolitan Water District

I strongly urge everyone connected with the Colorado River Aqueduct to read the article on this page by T. W. Osgood, safety engineer for the District. It deals with a subject which is of the highest importance to every man on the job, whether he is an employer or employee, and deserves thoughtful consideration.

No single phase of aqueduct construction has been given more thorough study by the Board of Directors and staff of the Metropolitan Water District than safety. From the very beginning of the work it has been our aim to make the aqueduct job a safe job.

In line with this policy, the accompanying article is presented. On as large a project as the aqueduct, a safety organization set-up is, of necessity, somewhat complicated. It is hoped that a complete explanation will make it more thoroughly understood, and therefore more effective.

I am particularly interested in the work of the safety clubs along the aqueduct line. These organizations give the men who work underground, and are closest to the subject, an opportunity to make suggestions and exchange ideas.

One thing must be understood — from the Colorado River to Los Angeles. The Metropolitan Water District means business about safety, and insists at all times upon full cooperation from everyone concerned.

SAFETY COMMITTEES, representative of the engineers, contractors, supervisors, and workmen, meet once each month at various points on the aqueduct and discuss ways and means for preventing accidents.

SAFETY CLUBS are made up of employees. They are organized for the purpose of making suggestions toward the improvement of safety conditions and the exchange of ideas among the men for mutual betterment. A prize is offered for the best suggestions made during the month by a member.

INDUSTRIAL ACCIDENT COMMISSION SAFETY ENGINEERS, in the course of their official functions, make inspections of the aqueduct work and lend cooperation in securing safety of the workmen.

COMPENSATION INSURANCE COMPANIES maintain resident safety engineers and inspectors on the work and they too are active in the prevention of accidents.

The United States Bureau of Mines trained 1264 aqueduct workers in first-aid to the injured and 40 men in mine-rescue during the fiscal year ending June 30, 1934; Bureau instructors are now conducting classes in this instruction and it is hoped and anticipated that this cooperative activity will be an annual feature of the safety work.

The safety inspection procedure is summarized as follows:

1. The Safety Engineer makes inspections and promptly advises the Division Engineers in writing of unsafe conditions and practices found to exist. He also verbally advises the resident inspectors and contractors' supervisors immediately after each inspection, regarding such unsafe conditions.

2. Written orders to correct the unsafe conditions called to attention by the Safety Engineer, or which otherwise become apparent, are issued promptly by the Division Engineers to the contractors in their respective divisions.

3. The Division Engineers follow up these orders and enforce compliance therewith in the event that any of the unsafe conditions therein noted are found not to have been corrected.

4. The Safety Engineer also checks the unsafe conditions noted in the orders and notifies the Division Engineers of any failure to comply with said order.

NEWS FROM FIELD AND OFFICE

S. H. Ash, district engineer of the United States Bureau of Mines, delivered an interesting address on accident records and tunnel accident prevention at the regular monthly meeting of the General Safety Committee, October 8, at the Banning Headquarters.

* * *

Acting on recommendation of General Manager Weymouth, the board of directors has accepted the $16,678 bid of the Blaw-Knox and Western Pipe Corporation for furnishing steel forms and appurtenant equipment for use in lining the Coachella tunnels. The proposal of the bidder on the items affording the District the option of purchasing additional forms and appurtenances at a later time also was accepted.

* * *

L. A. Tyler of the Division 6 staff has resigned his post to take a position with the Oilfields Testing and Engineering Company at Santa Fe Springs.

* * *

Another fine service mark is recorded in the following communication to the NEWS: "One of Erin's best, Thomas Scilk, a safety miner at Pushawalla Camp, claims a record. He came to work on April 19, 1933, and in a few days entered the heading and has never lost one day in time to date, and is still in the heading on the busy end of a machine."

* * *

On the authority of the board of directors, plans are being made to exhibit the District's large Colorado River Aqueduct relife map at the annual convention of the American Water Works Association, California Section, in Long Beach, October 24 to 27.

* * *

Studies have been started on the development of an appropriate architectural design for the permanent pumping plant buildings on the aqueduct line. Several different perspective sketches of the Intake plant have been prepared. Structural design of the buildings is being carried on at the same time, and is being coordinated with the architectural studies.

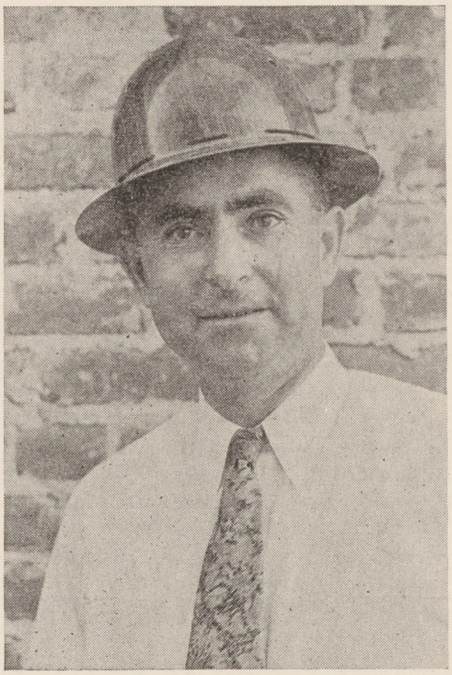
* * *

On the evening of October 10 the superintendents of the Coachella Division entertained Assistant General Manager Burkholder at a dinner at the Desert Inn, Palm Springs. The dinner served the dual purpose of welcoming Mr. Burkholder to the field and congratulating him on his birthday. The cake had 21 candles on it.

Flying during the month of September for the best camp records for safety, progress, and economy on the Coachella Division were:

Safety Flag—Morongo.
Economy Flag—Yellow.
Progress Flag—Long.

The "Hard Hat" of Division 3 was awarded to Winston Brothers at East Coxcomb tunnel for the month of September.



For auld lang syne we present this portrait of R. B. Diemer, once a denizen of the wide open spaces where men are men. Those days are gone. Where once perched the shining, manly dome of a hard-boiled hat, now rests a neat grey fedora. In short, friends, effete Los Angeles has claimed its own.

AQUEDUCT TEMPERATURES

Sept. 30 to Oct. 13, Inclusive

	Max.	Min.
Div. 1	105°	57°
Divs. 2 & 3	103°	51°
Div. 4	100°	54°
Divs. 5 & 6	103°	38°

The annual first-aid and mine-rescue training of aqueduct workers is being conducted again this year as the result of arrangements made with the United States Bureau of Mines, it is announced by Saftety Engineer Osgood. Emory Smith, an instructor of the Bureau, began training at Morongo Camp on October 9, and will continue the work in all other aqueduct camps. The training is being conducted on a cooperative basis; that is, District and contractors' employees showing the most aptitude are being selected to carry on the work under the direction of a Bureau instructor.

* * *

Harold J. (Dick) Dickinson surprised his friends of the Upland engineering force by cancelling his proposed vacation trip to San Francisco recently and used his time more profitably by taking unto himself a charming wife, Miss Florence Wright of Los Angeles.

* * *

Although the Coachella Division safety flag for September was awarded to Little Morongo, it was not without a struggle. Safety Engineer Osgood points out that both Little Morongo and Wide Canyon made outstanding records, both camps having worked through the month without a lost-time accident. The emblem was awarded to the former, however, because 11,410 man-hours more were worked during the month at that camp than were worked at Wide.

* * *

Another aqueduct wedding was that of Frank Weber of Upland office to Miss Grace Sargent of Los Angeles. The ceremony took place on Saturday, October 6.

* * *

Work has been started on the tunnel access road at Parker dam site in preparation for the construction of a trestle across the river just below the downstream cofferdam site.

* * *

A sign of autumn: The Division 1 headquarters air conditioning plant has been shut down for the season.

* * *

Dravo Contracting Company has started excavation for aggregate storage at Shaft No. 1 of Valverde tunnel. Four cars of concreting equipment have been received from Pittsburgh.

* * *

One more aqueduct newlywed was reported last week—Harvey Mattson, of Division 3, whose bride was Miss Carolyn Klaman, of Long Beach.

DIRECTORY

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Asst. to Gen. Mgr.....Don J. Kinsey

DIVISION ENGINEERS

Division 1.....R. C. Booth
Division 2.....W. E. Whittier
Division 3.....John Stearns
Division 4.....B. C. Leadbetter
Divisions 5 and 6.....J. B. Bond

SUPERINTENDENTS

Colorado River, Copper Basin and Whipple Mt. Tunnels, Walsh Construction Co., F. T. Huntington, Gen. Supt.; W. A. Huntington and E. A. Hatch, Tunnel Supts.

Coxcomb Tunnel and Iron Mt. shaft, Winston Bros., E. A. Bernard, Gen. Supt.; F. T. Hillman and R. B. Johnson, Tunnel Supts.

Iron Mt. Tunnel, West Portal, Utah Constr. Co., Ben Arp, Gen. Supt.

East Eagle Mt. Tunnel and West Eagle Mt. Tunnel, east portion, Broderick & Gordon. C. J. Kavanagh, Gen. Supt.

West Eagle Mt. Tunnel, west portion L. E. Dixon and Bent Bros., P. C. Guinn, Gen. Supt.

Hayfield Tunnel No. 1, Hunkin & Conkey Constr. Co., G. B. Hoag, Gen. Supt.; F. Backlund, Tunnel Supt.

Hayfield Tunnel No. 2, Shofner & Gordon, H. E. Warden, Gen. Supt.

Cottonwood Tunnel, J. F. Shea Co., Inc., Gilbert Shea, Gen. Mgr.; Joe Bonner and Carl Nelson, Tunnel Supts.

Mecca Pass Tunnels, Morrison-Knudsen, George Fortier, Gen. Supt.

Coachella Division, R. M. Merriman, Division Supt.

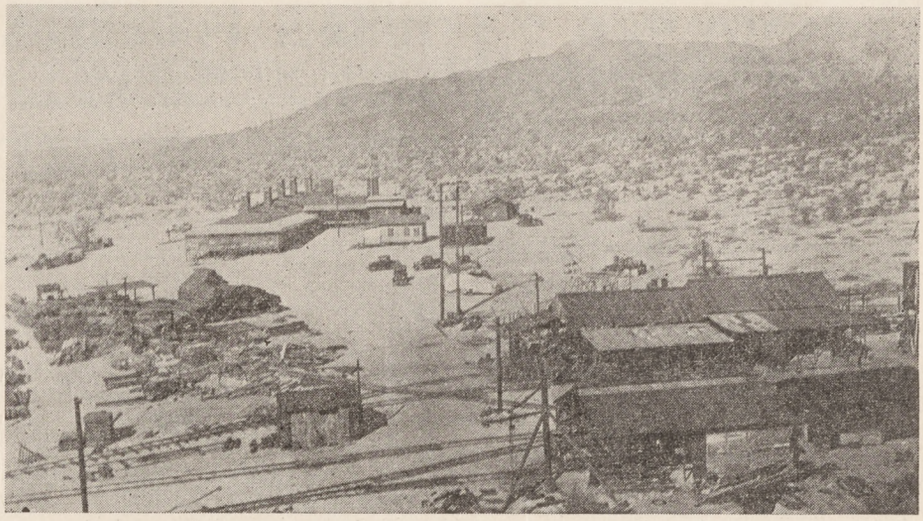
Yellow Canyon Adit, E. Coachella Tunnel—
District Force Account.....W. L. Taylor
Fargo Adit, East Coachella Tunnel—
District Force Account.....J. H. Manwaring
Berdoo Adit, East Coachella Tunnel—
District Force Account.....F. A. Weller
Pushawalla Adit, East Coachella Tunnel—
District Force Account.....Kenneth MacIsaac
Thousand Palms—
District Force Account.....D. L. Reaburn
Wide Canyon—
District Force Account.....John Jackman
Long Canyon—
District Force Account.....E. E. McCabe,
Little Morongo—
District Force Account.....R. L. Bryant,

Whitewater Tunnels, West Constr. Co., H. E. Carleton, Gen. Supt.; Angus MacDonnell, Tunnel Supt.

San Jacinto Tunnel, Wenzel & Henoch, Walter Hoenecke, Gen. Supt.; W. A. Boyd, Walter Baer, and Jack May, Tunnel Supts.

Bernasconi Tunnel, Hamilton & Gleason Co., H. J. King, Gen. Supt.

Valverde Tunnel, Dravo Contr. Co., R W. Remp, Gen. Supt.; H. C. Richarson, Asst. Gen. Supt.; Dean Luther, J. R. Glaeser, Jack Stone, and Fred Youmans, Tunnel Supts.



Shofner & Gordon's Hayfield No. 2 camp. Dormitory and mess hall are combined. Shop and lumber yard are in the foreground.

Aqueduct Division Boundaries Shifted

As a result of changes made during the month, the various construction divisions of the aqueduct now have the following boundaries:

Division 1—Intake to near Grommet; Division 2—Grommet to east portal of Coxcomb tunnel; Division 3—East portal of Coxcomb tunnel to the east portal of Cottonwood tunnel; Division 4—East portal of Cottonwood tunnel to the east end of Morongo siphon; Divisions 5 and 6—East end of Morongo siphon to Cajalco reservoir.

These changes result in the shifting of Iron Mountain tunnel from Division 3 to Division 2; the Hayfield tunnels from Division 4 to Division 3.

Another Coachella Division Dance Is Held

Another of the popular Coachella Division dances will have gone down into history by the time this issue of NEWS reaches its readers, Thursday having been set as the date for the affair.

The Hotel Indio is the sponsor of the dance, donating the various features, according to Chairman F. T. Fauble. Music was to be furnished by Brownie's Orchestra of Riverside, with entertainers from Fanchon and Marco providing song and dance numbers. Free sandwiches were to be another feature of the evening, and one of Harry Swango's desert cactus lamps was to be provided as a door prize.

District Personnel Transfers Are Announced

Shifts in Metropolitan Water District personnel, in line with the reaassignment of division engineers and the opening of Division 2, took place during the current month.

From the Banning office Draftsmen Byron L. Green and W. A. Elsterman and Instrumentman T. W. Eisenman were transferred to Los Angeles; Assistant Engineer David C. May, General Clerk C. R. Kollenborn, Rodman F. J. Doolittle, Chainman J. T. Bone, and Junior Engineer J. L. Seright, were shifted to Division 2; Assistant Engineer R. E. McGonagle and Junior Engineer J. A. Blain, to Division 4; Junior Engineer William Arnold, Junior Engineer Donald A. Loucks, and Chainman John Luther to Divisions 5 and 6.

From Division 3, shifts to Division 2 were made as follows: Rodman F. L. Brooks, Instrumentman J. D. Mendenhall, Levelman N. H. Buckner, Inspector J. L. Lafond, Assistant Engineer F. D. Rathbun, and Inspector H. Norton Johnson.

Junior Engineer William H. Saylor was transferred from Division 4 to the Los Angeles office and Junior Engineer J. G. Sherman from Division 6 to Division 2.

In the Los Angeles office the following shifts were made: Assistant Engineer Walter J. Neale from Distribution to Division 2; Assistant Engineer A. B. Bastos and Assistant Engineer D. A. Elliott from Design to Electrical-Mechanical; Draftsmen R. W. O'Neill, R. C. Kenmir, and R. A. Purchase, from Design to Distribution; Assistant Engineer R. P. Cravens, Junior Engineer H. S. Kleinschmidt, Assistant Engineer Linne C. Larson, Engineer W. H. Pinkham, Assistant Engineer W. T. Taylor, Jr., Assistant Engineer E. K. Walker, Assistant Engineer P. W. Warner, from Distribution to Design.

BEST PROGRESS
This Period
Rock Tunnels - Colorado River, 938 ft.
Gravel Tunnels - Whitewater No. 1, 333 ft.

TUNNEL PROGRESS

Sept. 16 to Oct. 15, 1934
Tunnel Excavated to Date, 45.28 Miles

BEST WEEK'S PROGRESS
This Year
Rock Tunnels - Colorado River, 265 ft.
Gravel Tunnels - Whitewater No. 2, 233 ft.

TUNNELS ON CONTRACT	Length in feet	Number of Shifts	EXCAVATION PROGRESS IN FEET: Average Per Shift	This Period	Total to date
Walsh Constr. Co.					
COLORADO RIVER	(5514)				
West Portal	5514	89	10.5	938	3527
COPPER BASIN, No. 1	(752)				
West Portal	752			0	752
COPPER BASIN, No. 2	(11,580)				
East from adit	1878			0	1878
Adit	330			0	330
West from adit	9702	87	9.7	848	7148
WHIPPLE MT.	(32,265)				
East from adit	18,352	90	7.8	701	6516
Adit	924			0	924
West from adit	13,913	90	6.4	587	5494
Winston Bros.					
IRON MT.	(39,759)				
East from shaft	9844	78	5.1	398	3070
Shaft	165			0	165
West from shaft	13,743	78	7.6	596	6282
Utah Constr. Co.					
IRON MT.					
West Portal	16,172	90	7.8	706	9204
Winston Bros.					
COXCOMB	(17,795)				
East Portal	8765	78	8.2	643	7499
West Portal	9030			0	0
Broderick & Gordon					
EAST EAGLE MT.	(9,442)				
West Portal	9442	78	6.4	500	1397
WEST EAGLE MT.	(26,494)				
East from adit	7871	78	7.2	560	3314
Adit	2008			0	2008
West from adit	7974	78	8.1	630	2723
Dixon & Bent					
WEST EAGLE MT.					
West Portal	10,649	75	5.4	402	6695
Hunkin & Conkey					
HAYFIELD, No. 1	(9677)				
East from adit	5317	77	6.9	532	3289
Adit	511			0	511
West from adit	4360	77	7.0	542	2916
Shofner & Gordon					
HAYFIELD, No. 2	(5435)				
West Portal	5435	50	6.8	342	3813

TUNNELS ON CONTRACT	Length in feet	Number of Shifts	EXCAVATION PROGRESS IN FEET: Average Per Shift	This Period	Total to date
J. F. Shea Co.					
COTTONWOOD	(20,105)				
East Portal	10,114	74	8.8	662	8444
West Portal	9991	78	11.7	879	8381
Morrison-Knudsen					
MECCA PASS	(5,940)				
No. 1, West Portal	338			0	338
No. 2, West Portal	997			0	997
No. 3, East Portal	4605			0	4605
West Constr. Co.					
WHITEWATER	(10,232)				
No. 1, West Portal	2060	57	5.8	333	368
No. 2, East Portal	8172	12	0.4	5	8172
Wenzel & Henoch					
SAN JACINTO	(67,415)				
East from Cabazon	8553	93	4.5	417	1449
Cabazon shaft	246			0	246
Cross drift	935			0	935
West from Cabazon	22,839	93	4.7	435	4719
East from Potrero	20,589	0	0	0	160
Potrero shaft	796	90	0	0	796
West from Potrero	6712	0	0	0	223
West Portal	8722	93	5.2	482	3220
Hamilton & Gleason					
BERNASCONI	(6220)				
East Portal	6220	52	6.7	347	5078
Dravo Contr. Co.					
VALVERDE	(38,765)				
East from Shaft 1	2140	0	0	0	2140
Shaft 1	64			0	64
West from Shaft 1	1525	84	4.1	346	2086
East from Shaft 2	5400	84	2.4	204	4459
Shaft 2	204			0	204
West from Shaft 2	5400	84	4.7	398	5128
East from Shaft 3	6950	84	1.3	106	2614
Shaft 3	192			0	192
West from Shaft 3	6950	84	3.0	251	4862
East from Adit	5117	50	1.6	78	78
Adit	391			0	391
West from Adit	5283	56	1.2	67	83
Total Excav. Contract Tunnels exclusive of Adits and Shafts	307,390	2271	6.1	13,935	143,121
(In Miles)	58.22			2.64	27.11

TUNNELS ON FORCE ACCOUNT

	Sched.					
EAST COACHELLA TUNNEL		(96,605)				
Yellow Canyon Adit		686			0	686
East from adit	1	10,204	75	8.2	617	7898
West from adit	1	10,076	75	10.0	753	8072
Fargo Canyon Adit		891			0	891
East from adit	2	11,850	75	7.4	553	7018
West from adit	2	15,200	75	6.3	472	5836
Berdoo Canyon Adit		2042			0	2042
East from adit	3	15,824	75	6.6	494	8052
West from adit	3	12,456	75	9.7	724	8280
Pushawalla Canyon Adit		2935			0	2935
East from adit	4	10,186	75	10.1	757	5784
West from adit	4	10,809	75	8.2	614	5972
WEST COACHELLA TUNNELS		(81,454)				
THOUSAND PALMS						
No. 1, West Portal	5	16,058	75	6.5	486	7017
No. 2, Tunnel	5	3838			0	3838

	Sched.					
WIDE CANYON						
No. 1, E. Portal	5	5122	75	1.2	91	2978
No. 1, W. Portal	6	9183	75	4.4	332	6700
No. 2 Tunnel	6	848			0	848
SEVEN PALMS		(16,730)				
E. Portal	6	8390	0	0	0	4810
W. Portal	7	8340	75	8.4	633	3572
LONG CANYON		(15,295)				
E. Portal	7	8360	75	10.1	760	3530
W. Portal	8	6935				0
BLIND CANYON		(6848)				
E. Portal	8	—				0
W. Portal	8	6848	75	9.8	733	3171
MORONGO No. 1		(5712)				
E. Portal	8	5712	75	7.8	585	2572
W. Portal	8	—				0
MORONGO No. 2		(1820)				
E. Portal	8	1820				0
W. Portal	8	—				0
Total excav. Force Acct. Tunnels excl. of Adits and Shafts		178,059	1,125	7.6	8,604	95,948
(In Miles)		33.72			1.63	18.17
Total Tunnel Excavation (Miles)		91.94		6.6 ft.	4.27	45.28

Heading excavation is counted as two-thirds of full tunnel excavation. Adit and Shaft progress is not included in total footage.

Parker Dam Plans Summarized By F. T. Crowe

With work already under way on the Parker Dam unit of the aqueduct, the following summary of current and future plans of Six Companies, Inc., contractors on the job, will be of interest to readers of the NEWS.

It was issued by F. T. Crowe of Six Companies:

"Six Companies Inc. crews began clearing the site and preparing for preliminary work on October 1st, 1934."

"Anderson Boarding and Supply Company will operate the mess-hall and dormitories for Six Companies Inc. and Six Companies Inc. subcontractors. Anderson Brothers established a temporary camp for 75 to 100 men on October 1st, and this camp will be used until the permanent buildings are ready for occupancy.

"Six Companies Inc. forces will begin work on the streets, lighting, water and sewer facilities for the job immediately. The water supply will be from a well located near the river, pumping into a 125,000-gallon storage tank, to be located on the hill between the camp and the job.

"Work will be commenced immediately on a pile trestle bridge just below the site of the lower cofferdam. This bridge will give access to the lower tunnel portals and will be used for all transportation to the Arizona side of the river until the cofferdams are completed in the fall of 1935.

"A steel shop building, 90x144 feet, will be located between the camp and the job, on the California side of the river. This building will house compressors, shop and garage equipment.

"A subcontract has been let to the J. F. Shea Company, Inc., for the construction of the diversion tunnels and the highway along the California bank of the river. The subcontract will include all of the items in schedule No. 1 of the Bureau of Reclamation Specifications No. 574, except that work pertaining to the Forebay excavation. Work on this subcontract will begin within thirty days, and will be completed by July 1st, 1935.

"Work on the 1,500,000 cubic yards of dam excavation will begin in the fall of 1935, soon after the completion of the diversion tunnels."

LOW BIDS ON NEW AQUEDUCT CONSTRUCTION SCHEDULES TOTAL $14,126,175

Award of contracts for construction of 110 miles of aqueduct canals, conduits, and siphons was made Friday by the Board of Directors in accordance with a recommendation from General Manager Weymouth and on the basis of the bids given below.

With more than 500 bidders, equipment and materialsmen, and interested onlookers crowded into every available inch of space in Room 3 of basement of the Los Angeles headquarters building, bids on 110 miles of aqueduct conduit, siphon, and canal were opened last week.

The total of the low bids received on the 16 schedules advertised was $14,126,175.45. With 29 voluminous bids received, analysis of the bidding sheets was a complicated task, engineers beginning the work after the tenders were read on Thursday, and continuing straaight through the weekend. The bidders were:

Hanrahan Co.; Youdell Construction Co.; Elliott, Stroud Brothers, and Seabrook; Charles Harlow, Jr., of San Francisco and Pasadena bidding on Schedules, 1, 10, 11, and 13—$3,461,543. This figure, submitted jointly by the companies named, covered approximately twenty-seven and one-half miles of construction work.

Barrett and Hilp and the Macco Corp., of Clearwater, bidding Schedules 2, 3, and 7—$2,923,207.10. The bid covers approximately eighteen and one-half miles of construction.

Jahn and Bressi Construction Company, of Los Angeles, bidding on Schedules 4 and 5—$1,420,375. The bid covers twenty and one-quarter miles of work.

C. W. Wood and M. J. Beranda, of Stockton, bidding on Schedules 6 and 8—$1,282,600.50. The bid covers twelve and one-third miles of construction.

Utah Construction Company, of San Francisco, bidding on Schedule 9—$955,248.50. The bid covers approximately nine miles of construction.

Three Companies, Inc., of Denver, bidding on Schedule 12—$1,313,272.30. The figure covers six and one-third miles of work.

Thompson-Starrett Company, New York City, bidding on Schedules 14, 15, 16—$2,769,929.05. These schedules cover sixteen and one-half miles of construction.

In each instance the low bids were submitted on the basis of monolithic (cast in place) construction.

Aqueduct construction on which the bids were received constitutes the largest single block of work, in point of miles, to be undertaken at one time since the project was launched.

BIDS ON 30 MORE MILES OF WORK TO BE OPENED OCT. 31

Making ready for the launching of work on the remaining aqueduct siphons and conduits, the Metropolitan Water District will open bids, on October 31, on 30 more miles of construction.

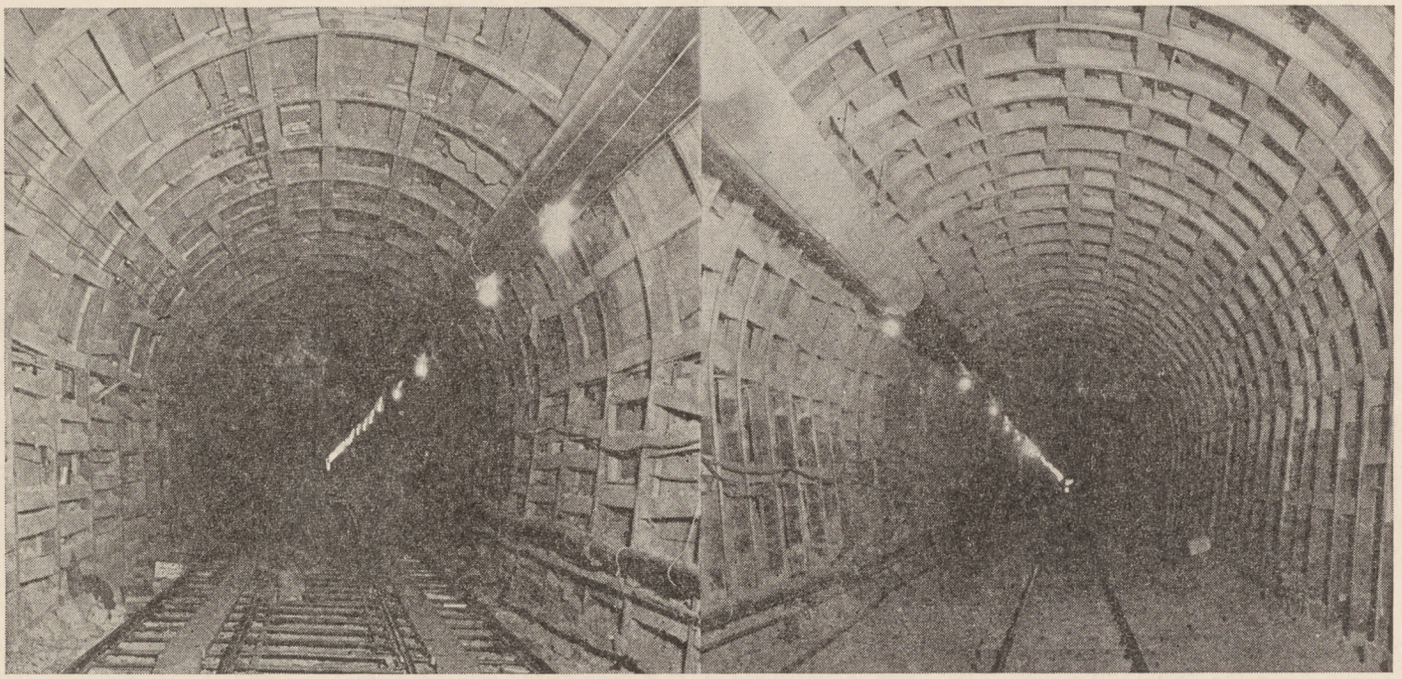
Sealed proposals for building these equeduct sections will be received at 306 W. Third Street, Los Angeles, until 10 a. m., at which time they will be publicly opened and read in Room 3 in the basement of the headquarters building.

The cost of the new work, including materials, rights of way, and engineering, is estimated at approximately $10,000,000.

All the work is located in Riverside County, along 50 miles of aqueduct line between Big Morongo Canyon and Cajalco Reservoir. The new sections will link together the Whitewater, San Jacinto, Bernasconi, and Valverde tunnels, already under construction on that same section of aqueduct line.

In addition to the 18.07 miles of conduit and 11.52 miles of siphons, specifications cover construction of 0.91 miles of outlet channel. This channel is to have a bottom width of approximately 25 feet.

The conduit will be of semi-eliptical section with heights of about 15.4 and 16 feet. Siphons generally are to be of precast concrete pipe or monolithic (cast in place) construction, alternative bids being called for these two types. For two of the siphons, approximately 1.8 miles long, alternative bids will be received for welded steel or precast construction. Precast construction only will be considered for one 1.48-mile schedule.



Left—Steel rib support with timber lagging which has been used with success on the Coachella Division. In this picture the ribs are on six-foot centers. The lower collar braces are still in place. These are placed from six to twelve inches apart below the spring line to prevent damaging steel ribs from fly rock. The California switch, or dual system of tracks superimposed over the main hauling track may be noted in the foreground. This switching system is used in all the Coachella tunnels. Right—Steel ribs with timber lagging, ribs being on three-foot centers, closely laced with collar braces to prevent shifting of ribs during shooting operations and buckling from taking weight due to heavy ground. Collar braces will be removed before concreting.

NEW TYPE OF TUNNEL SUPPORT USED WITH SUCCESS BY M. W. D. AND SHEA

During the past two months the District forces driving the Coachella tunnels have been making excellent progress through ground requiring support. Part of this progress is attributed to the time saved in placing the new type of tunnel support which has recently been adopted for use on these tunnels.

In the NEWS of April 5, mention was made that the District forces were testing out a new type of tunnel support, a combination of steel ribs with timber lagging. At that time 65 per cent of the entire length of tunnels which had been driven had required support. Two types of support were then in use: timber sets of 10x10 inches, or 12x12 inch timbers with two-inch lagging, and steel ribs, posts, wall beams with liner plates for lagging.

Costs Vary

Tunnel costs vary with the quantities of excavation and concrete together with the type of support when support is required to maintain the excavation until the tunnel lining is placed. Steel liner plates supported by ribs are more expensive than timber support due to the amount of steel required and the present price of steel. This is true notwithstanding the fact that both the quantities of excavation and concrete are considerably less. To effect a saving, the design of a tunnel support using the steel ribs with timber lagging was made and found to be practicable, as shown by tests made by the District forces in April. The quantities of excavation and concrete are approximately the same as those when the steel liner plate support is used, but the amount of steel required is reduced 50 to 75 per cent, depending upon the spacing of the ribs.

Steel Ribs

The steel ribs are six-inch I beams fabricated in two pieces with a bolted butt joint in the center of the crown. The complete rib weighs about 590 pounds. As soon as mucking operations are completed, foot blocks are placed and the ribs are rapidly set in place. Four by six-inch timber spreaders are placed between the ribs at intervals from one to four feet to prevent the ribs moving out of position during blasting operations and to prevent buckling of the ribs when taking weight due to ground conditions. Steel tie rods, spaced four feet apart, tie the ribs together to prevent collar braces slipping out of place. The ribs are securely blocked to prevent shifting due to unequal loading. The timber lagging is placed at the same time the other operations are being done.

Better Progress

The tunnel crews at first doubted the use of this type of support, but in a short time all of them were enthusiastic about its use, for better progress was possible than had previously been made with either the timber sets or steel liner plate supports.

Since July 19, when the first shipment of steel ribs for the new type support was received, the District forces working on the fifteen headings on the Coachella tunnels have made exceptional progress wherever support was necessary to maintain the excavation in safety. A total of 822 tons of steel ribs was used to support 14,000 feet of tunnel.

The J. F. Shea Co., contractors on the Cottonwood tunnels, started the use of this type of support in their west heading on September 4, and have continued to make excellent progress since that date.